

CA20N
DT
- 1991
081



An Overview of the Co-ordinator of Highway Safety Research Grant Program

June, 1991



Ministry
of
Transportation

SCDO-91-118



Digitized by the Internet Archive
in 2024 with funding from
University of Toronto

<https://archive.org/details/31761118914308>

An Overview of the Co-ordinator of Highway Safety Research Grant Program



June, 1991

SCDO-91-118

ISBN 0-7729-9079-4



Ministry
of
Transportation

The Co-ordinator of Highway Safety Research Grant Program

Ministry of Transportation, Ontario

Introduction

The Ministry of Transportation highway safety research grant program is sponsored by the **Ontario Co-ordinator of Highway Safety** in the Ministry. The purpose of this grant program is to encourage basic and applied research on the **behavioural, economic, methodological, and social** aspects of highway safety, from educational activities to theoretical problems of traffic collision analysis. In addition to the use of accepted methods in highway safety, it is hoped that **research methodologies** developed by scientists for other purposes may be adapted to highway safety.

Another purpose of the grant program is to encourage research scientists to transfer their knowledge and skills from a related discipline to highway safety.

While the Ministry of Transportation contracts research in some areas of highway safety, it cannot encompass all areas of this broad field, in which research may lead to the development and application of efficient and effective means of reducing traffic accidents. The research grant program is designed to supplement the expertise at the Ministry of Transportation with that available in the academic community.

Scope of the Research Grant Program

Research carried out in Ontario universities, Ontario colleges, Ryerson Polytechnical Institute, and the Ontario Institute for Studies in Education (OISE) is eligible for funding by the Co-ordinator of Highway Safety Research Grant program. The principal researchers are expected to be members of the faculty at the sponsoring institution.

Faculty members carrying out research in such departments as: **Economics, Engineering, Geography, Medicine, Psychology, Sociology**, among others, are encouraged to apply for grants in highway safety under this program. Research activities supported by this grant program will be in the behavioural and social sciences and will include methodology of accident analysis by which behavioural or social factors may be analysed.

Research on aspects of highway and vehicle engineering are more appropriately funded by grants from other agencies whose interests encompass highway and vehicle design. Similarly, medical research on physiological trauma in traffic accident victims and emergency medical services in trauma care are funded by other agencies and foundations. These areas will **not** be funded by the present grant program. This is not to exclude faculty in these disciplines from applying for research grants provided they investigate the behavioural, economic, methodological, or social aspects of highway safety.

Selection Criteria

Applications for funds from the Co-ordinator of Highway Safety Research Grant Program are reviewed by members of the **Safety Co-ordination & Development Office (SCDO), Transportation Regulation Development Branch**, in the **Ministry of Transportation**. One or more professional highway safety research scientists, external to SCDO or the Ministry may be requested to review applications, at the discretion of the Ministry.

The selection criteria for new applications are as follows:

- o The quality of the proposed research project in the context of the area of highway safety to which the research is applicable
- o Experience and qualifications of the researcher(s) in highway safety or related fields (the latter is meant to allow professionals in other areas to transfer their expertise to highway safety)
- o The applicability of the methods and/or results to Ontario highway safety
- o Demonstrated awareness of work performed in this area
- o Adequacy and appropriateness of the study design, methods, and proposed analysis
- o Feasibility of accomplishing the stated aims within the estimated time and budget using the proposed methods
- o The potential for the research to result in important, significant, understanding of or improvement in highway safety in Ontario, considering costs and benefits in applying the results
- o A realistic and justifiable budget, including the optimal use of proposed personnel

The following criteria for the assessment of a proposal to **continue** a project approved in principle for funding for more than one year are used:

- o Have the original aims and methods been accomplished?
- o Has the applicant adhered to the original timetable?
- o Can the project be completed on schedule?
- o Has adequate justification been provided (in the request for continued funding) for any modifications in the original aims, methods, or timetable?

- o Have the revised budget and staffing details been adequately justified?
- o Will there be significantly more and useful information arising from an extra year of study, considering, among other things, advances in the field since the project began?

The selection committee may request, by letter or personal interview, clarification from the applicants of their proposal.

The selection committee will make recommendations to the Co-ordinator of Highway Safety, Ministry of Transportation, who will decide which proposals will be awarded funds. Partial support of a project may be recommended by the committee.

Annual Conference

In early May each year, a conference is held to provide a forum for discussion of the results of research from grants held during the previous grant year (April 1 to March 31). The principal researchers and their colleagues are invited to present the findings arising from their research. Members of the highway safety community, the Ministry of Transportation, and other ministries are also invited to attend.

The conference lasts one day, during which the Co-ordinator of Highway Safety discusses some areas of highway safety of interest to the Ministry. Grant holders present the results of their research funded by this grant program, followed by open discussion of each of the papers.

On succeeding pages are lists of the grants awarded during the three years of the program, summaries of the two new projects funded for the 1991-1992 year, and abstracts of papers presented by the grant holders at the two annual conferences held to date.

Further information on the grant program and the annual conference is available from:

Co-ordinator of Highway Safety
 Research Grant Program
 Safety Co-ordination and Development Office
 Transportation Regulation Development Branch
 Ministry of Transportation
 Rm. 201, West Building
 1201 Wilson Avenue
 Downsview, Ontario
 M3M 1J8

Telephone: (416) 235-3620
 Facsimile: (416) 235-3633

**Grants awarded through the Co-ordinator of Highway Safety
Research Grant Program, 1989 to 1991**

**NAME OF APPLICANT, PROJECT TITLE, AMOUNT OF AWARD,
LENGTH OF AWARD**

Year 1, 1989-1990

- M. Chipman, University of Toronto
Evaluation of a bicycle safety education program;
\$9,204 (1 year)
- D. Wiesenthal, York University, Toronto
Driver behaviour at stop signs;
\$19,910 (1 year)
- G. Wilde, Queen's University at Kingston
Risk perception and risk acceptance by young males;
\$19,050 (3 years)
- F. Saccomanno, University of Waterloo
Mathematical models of accident causes for motor vehicles on Ontario
highways; \$23,310 (3 years)
- P. Maxim, University of Western Ontario, London
Technical analysis of the 1986 Ontario survey of night-time drivers;
\$17,573. (1 year)
- F. Ruemper, Georgian College, Barrie
College student seat belt use;
\$23,200 (2 years)

Total awarded in year 1: \$112,247

Year 2, 1990-1991

(A) New Grants:

- M. Chipman, University of Toronto
The role of time and distance in exposure to risk;
\$13,775 (1 year)
- L. Chambers, McMaster University, Hamilton
Child pedestrian safety initiatives;
\$33,528 (2 years)

P. Maxim, University of Western Ontario, London

Impact of motor vehicle fatalities on life expectancy;

\$19,642.34 (1 year)

(B) Grants Carried Over from Previous Year:

G. Wilde, Queen's University at Kingston

Risk perception and risk acceptance by young males;

\$14,800 (year 2 of 3)

F. Saccomanno, University of Waterloo

Mathematical models of accident causes for motor vehicles on Ontario highways; \$23,310 (year 2 of 3)

F. Ruemper, Georgian College, Barrie

College student seat belt use;

\$23,200 (year 2 of 2)

Total awarded in year 2: \$125,445.34

Year 3, 1991-1992

(A) New Grants:

P. Parkin

Effectiveness of a school based educational program in increasing bicycle helmet use and awareness in school age children;

\$19,450 (1 year)

C. Knapper

Weather hazards, driver attitudes and driver education;

\$20,738 (2 years)

(B) Grants Carried Over from Previous Year:

G. Wilde

Risk perception and risk acceptance by young males;

\$14,800 (year 3 of 3)

F. Saccomanno

Mathematical models of accident causes for motor vehicles on Ontario Highways;

\$25,574.60 (year 3 of 3)

L. Chambers

The facilitation of child pedestrian safety initiatives in communities with high child pedestrian accidents in Hamilton-Wentworth; \$33,528 (year 2 of 2)

Total awarded in year 3: \$114,090.60

Total awarded in years 1 through 3: \$351,782.94

* * *

Summaries of New Projects

Funded in 1991

**"Be Bike Smart": Effectiveness of a School Board Educational
Program in Increasing Bicycle Helmet Awareness
and Use in School Aged Children**

Dr. Patricia Parkin

Hospital for Sick Children, University of Toronto

Bicycle related head injuries are an important cause of death and disability in school aged children. Investigators from the Hospital for Sick Children/ Kiwanis Injury Prevention & Research Program (HSC/KIPRP) have studied fatal bicycle accidents in children in Ontario using coroner's records. In the three years, 1985 through 1987, 55 deaths resulted from bicycle accidents. This accounted for 15 per cent of all deaths in this age group in Ontario. In 45 cases (81 per cent) the injuries were deemed unsurvivable; 96 per cent of these were head and neck injuries. None of the victims was wearing a helmet at the time of the injury.

The literature on bicycle related head injuries has documented four important facts: (1) The morbidity and mortality of bicycle related head injuries are great in the pediatric population; (2) Bicycle helmets are effective in reducing bicycle related head injuries; (3) Bicycle helmets are not commonly used by children; (4) Intervention programs may be effective in increasing bicycle helmet use and awareness.

In the summer of 1990, a survey of bicycle helmet use by school aged children in the borough of East York conducted by HSC/KIPRP found that only 3.4 per cent of children wore bicycle helmets.

In this project, the investigators plan to collaborate with the East York Department of Public Health, the East York Board of Education, and the Metropolitan Toronto Police to develop a school based educational program in four East York schools. The program will consist of one week of activities to raise awareness about the importance of bicycle related head injuries and bicycle helmets. The program will include a lecture and information for parents, lectures for the children, class activities surrounding bicycle helmets, helmet fitting and purchase of helmets, and a bicycle rodeo and maintenance check promoting bicycle helmets.

To evaluate the success of the educational program, questionnaires will be used to assess the school children's awareness of the importance of bicycle helmets both before and after the program. To evaluate the effect of the educational program on children's behaviour, observations will be made at selected schools and throughout the borough of East York.

If the school based educational program is found to be effective in increasing bicycle helmet awareness and use in school aged children, similar educational programs may be developed in communities throughout Ontario. The overall objective is to reduce death and disability caused by injuries to children in Ontario.

* * *

Patricia Parkin, M.D.

Department of Pediatrics
University of Toronto
Toronto, Ontario
M5S 1A1

Hospital for Sick Children
555 University Avenue
Toronto, Ontario
M5G 1X8

Tel. (416) 598-6359

Weather Hazards, Driver Attitudes, and Driver Education

Dr. Christopher Knapper and Dr. Jean Andrey

University of Waterloo

Every driver knows that poor weather makes driving more difficult and more dangerous, but surprisingly little is known about the role of weather conditions in traffic accidents. The aim of this research is to probe public knowledge and attitudes concerning driving in adverse weather conditions, to investigate what is communicated about weather hazards in driver education programs, and to examine these findings in the light of data on actual risk levels under different driving conditions.

A representative sample of drivers in Ottawa and Hamilton will be interviewed to determine their opinions about driving in adverse weather conditions, and their views of the relative risk of weather versus other potential driving hazards. These two cities have been chosen because they experience different weather conditions, but otherwise represent the mix of driving environments experienced by most Canadian drivers. Driver educators in the same cities will also be interviewed, and driver training curricula will be examined to determine the type of weather-related attitudes and advice communicated to students. The research should lead to a better understanding of public attitudes to driving in bad weather as well as suggestions for improvement of driver training to cope with adverse weather conditions.

* * *

Christopher Knapper, Ph.D.
Faculty of Environmental Studies

Jean Andrey, Ph.D.
Department of Geography

University of Waterloo
Waterloo, Ontario
N2L 3G1

Tel. (519) 885-1211 Ext. 2579

(519) 885-1211 Ext. 3629

**Abstracts of Papers
Presented at the
First Annual Conference
of Recipients of Grants from
the Co-ordinator of Highway Safety**

1989 - 1990

Toronto May 9, 1990

Evaluation of the Effectiveness of a Bicycle Safety Program

Mary Chipman, University of Toronto

(revised August, 1990)

In children 4-15 years of age, bicycle accidents account for a substantial number of deaths and serious injuries each year. Education programs are frequently proposed as a remedy. The objective of this study was to evaluate the effectiveness of an elementary school program designed to promote safe bicycle use.

In Metropolitan Toronto, the police force carries out bicycle safety education in public and separate schools. The program aims to improve school children's knowledge of bicycle safety and ultimately the application of this knowledge to bicycle riding behaviour. In this study, we tested children on their understanding of bicycle safety before and after the program. Thirty classes in grades 4 to 6 were selected from schools in Metropolitan Toronto. Of these fifteen received the Roadeo, seven classroom instruction and eight whose safety program -- classroom or Roadeo -- was scheduled for so late in the term that they could serve as a control group.

Background information about the students indicated that ownership was high (88 per cent) and helmet use low (7 per cent). No evidence of effect was found between the three groups of classes, although all three groups found the second quiz more difficult than the first. Specific comparisons between questions on the two quizzes, and other comparisons in reported behaviour -- from the riding of bikes to school to the wearing of helmets -- revealed issues related to children's judgement and perception of risk which have implications for the development of education materials and the most appropriate targets for education.

Overall, the teachers rated the bicycle safety education program positively, with some useful suggestions in specific circumstances.

* * *

Professor Mary Chipman
Department of Preventive
Medicine & Biostatistics
University of Toronto
12 Queen's Park Cr. West
Toronto, Ontario
M5S 1A8

Tel. (416) 978-6150

The Effects of Prompts on Driver Behaviour at Stop Signs

David L. Wiesenthal & Douglas Ford, York University

The effects of two different prompts on driver behaviour was studied in field research conducted in Toronto. A prompt was defined as an antecedent stimulus that affects the likelihood of a subsequent response. Signs were posted that stated either "Good Drivers Make Full Stops at Stop Signs" or "Drivers Not Making Full Stops at Stop Signs May Be Fined". These signs were posted approximately 100 metres before intersections. The location of the intersection was systematically varied so that either industrial areas or residential streets were studied. Vehicles were recorded by a tripod-mounted video camcorder placed near the intersection.

It was predicted that the polite prompt would induce greater compliance in making a full stop than a threatening prompt. The effect of the prompt on increasing the vehicle's speed in crossing the intersection, time of day, signalling of turns and driver/vehicle characteristics were also examined. The results will be presented and discussed from the standpoint of danger compensation theory and behaviour modification.

* * *

Professor David Wiesenthal, Ph.D.
Department of Psychology
York University
4700 Keele Street
North York, Ontario
M3J 1P3

Tel. (416) 736-2100, Ext. 66136

Risk Taking in Young Male Drivers

Gerald J.S. Wilde & Ruediger M. Trimpop, Queen's University at Kingston

This study examines the hypothesis that the excess fatality and injury rates in young males is a reflection of a personality trait that manifests itself in risk taking in multiple spheres of behaviour and not only in driving. This was tested by means of personality questionnaires and objective and quantitative measures of risk-taking tendency under laboratory conditions. These measures also allowed testing of the hypothesis that physiological, emotional, cognitive and behavioural measures of risk taking show a coherent pattern of interrelation. It was further investigated whether those individuals who are willing to take financial risks, accept risks of potential social disapproval as well. Furthermore, this study was designed to experimentally test the notion that young drivers will adjust their behaviour in reaction to external interventions that alter the likelihood of loss associated with particular actions, while their degree of willingness to take risks essentially remains the same.

Finally and perhaps most importantly, the experiments aimed to demonstrate that the offering of incentives for cautious action has the effect of decreasing young people's willingness to take risks, and thus of motivating them to be more prudent.

Data collected from 120 male subjects (mean age 22, range 16-29) showed statistically significant support for all of the above hypotheses. While the personality questionnaire measures and the physiological measures of risk were significantly correlated with one another and with the experimental measures of risk and self-reported driving record (accidents and violations), these correlations were all modest in size. In contrast, the effects of the experimental manipulations intended to change risk-taking behaviour, were very strong. The offering of incentives for cautious action also proved highly effective.

It was concluded that the latter finding could serve as the basis for the development of effective accident countermeasures.

(Ed. Note: This report was provided at the end of the first year of a three year grant.)

* * *

Professor G.J.S. Wilde, Ph.D.
Department of Psychology
Queen's University
Kingston, Ontario
N7L 3N6

Tel. (613) 545-2889

Seat Belt Law Compliance Amongst Young Drivers

Fred Ruemper, Georgian College

Young drivers when compared with more experienced drivers, are more likely to be involved in traffic accidents, less likely to wear seat belts, yet are better educated in driver safety. This research project is focused on the non-compliance of young drivers with seat belt laws which mandate their use. The model being examined asserts that social beliefs about the seriousness of deviance are moderated by personal attributions about control as well as individual self-esteem. Comparisons are made with other health risk deviance such as: smoking, alcohol and drug abuse, unsafe sex, and improper diet. The findings are directed at segmenting the young driver group such that more specific traffic safety campaigns can be directed at those who currently do not comply with the law.

(Ed. Note: This report was provided at the end of the first year of a two year grant.)

* * *

Mr. F. Ruemper
School of Business
Georgian College of
Applied Arts & Technology
1 Georgian Drive
Barrie, Ontario
L4M 3X9

Tel. (705) 728-1951

Technical Analysis of the 1986 Ontario Survey of Nighttime Drivers

Paul Maxim, University of Western Ontario

Ed. Note: Abstracts are unavailable. Dr. Maxim's complete papers are available from the author or the Research and Evaluation section, Safety Co-ordination and Development Office (235-3620).

The titles of the papers are:

Non-response bias in the 1986 Ontario Roadside Survey

and

**Design effects and the pursuit of precision --
The 1986 Ontario Roadside Survey of Nighttime Drivers**

* * *

Professor Paul Maxim, Ph.D.
Department of Sociology
University of Western Ontario
London, Ontario
N6A 5C2

Tel. (519) 679-2111 Ext. 5121

Models of Accident Causes for Trucks and Cars

Frank Saccomanno, University of Waterloo

An analysis of factors affecting large truck accident rates is presented. A series of GLIM loglinear models are calibrated to measure the strength of association between accident rates for different truck configurations and various road, vehicle, and driver characteristics. These models are calibrated based on Ontario accident and exposure data for a four year period, 1983 to 1986.

The analysis of truck accident rates is discussed in terms of three roadway locations: (1) links, (2) major intersections and (3) freeway ramps.

The primary causes of truck accidents are identified for different truck configurations as a function of vehicle manoeuvre and underlying accident environment. Accident environment is defined in terms of various factors explaining variation in accident rates from the data.

(Ed. Note: This report was provided at the end of the first year of a three year grant.)

* * *

Professor Frank Saccomanno, Ph.D.
Institute for Risk Research
University of Waterloo
Waterloo, Ontario
N2L 3G1

Tel. (519) 885-1211 Ext. 2631

**Abstracts of Papers
Presented at the
Second Annual Conference
of Recipients of Grants from
the Co-ordinator of Highway Safety**

1990 - 1991

Toronto May 8, 1991

Community-Based Initiatives in Child Pedestrian Safety

Larry W. Chambers^{*,+}, Vicki Woodcox^{*,+}, Kim Sheppard⁺ & Cathy Buffett^{*,+}.

^{*}McMaster University; ⁺Department of Public Health Services, the Regional Municipality of Hamilton-Wentworth

As in communities elsewhere in Canada, the Regional Municipality of Hamilton- Wentworth children between five and nine years of age are over three times more likely to be involved in a collision with a vehicle than are any other age group. With this information in hand, a group of Regional health planners determined the amount of variation in the rate of injuries across neighbourhoods in order to determine the justification for targeting health promotion interventions at selected neighbourhoods.

Neighbourhood pedestrian injuries reported by Regional police for children aged 5 to 9 for the years 1985 to 1987 were obtained. Absolute numbers of injuries, rates of injuries using neighbourhood population estimates, income estimates for neighbourhoods from National Census data, and other neighbourhood social indicators such as use of community social services were used to identify target neighbourhoods. Geographical mapping of the location of childhood pedestrian injuries revealed that they are more likely to occur in six neighbourhoods which have a large proportion of low income families and a relatively high population density compared to other areas of the Region.

The presentation will report on a community based initiative regarding pedestrian safety. This involves the deployment of a public health nurse to facilitate an organized approach by the community in addressing this issue. She is working with health professionals, transportation experts, police, parents, teachers and volunteers. After eight months of consultations and information sharing, a public forum involving these groups was sponsored by a subcommittee of the Traffic and Environment committee of the Regional Municipality of Hamilton-Wentworth. One result of the forum will be the formation of a coalition of these groups to work on child pedestrian safety.

(Ed. Note: This report was provided during the first of its two years, hence no information on program effectiveness is yet available.)

* * *

Larry Chambers, Ph.D.
Department of Public Health Services
Municipality of Hamilton-Wentworth
P.O. Box 897
Hamilton, Ontario
L8N 3P6

Tel. (416) 528-1441 Ext 232

The Role of Time and Distance in Assessing Exposure to Risk of Motor Vehicle Collisions

Mary Chipman, University of Toronto

It is easy to take a very simple view of exposure to the risk of collision. There are many practical reasons why distance driven is a useful measure, and many logical reasons why time spent driving should be a better measure. The Ontario Exposure Survey of 1988 obtained data on daily times and distances for 3,686 Ontario drivers, chosen by age group, sex, and region of residence. The differences in exposure apparent for time and distance are not always consistent, due to differences in average speed. This is especially evident in comparisons between men and women, and in different regions of the province.

These differences show up in comparisons of traffic crash rates, computed per million driver-kilometres and per thousand driver-days: older women, for example, have substantially higher rates than men of the same age for distance-based rates, but not for time-based rates. The time taken to cover a given distance is more likely to reflect true exposure to risk than distance alone, but methods of measurement of time spent driving are far from standard. We need to pay attention to both distance and time and ensure that both can be easily and consistently measured.

* * *

Professor Mary Chipman
Department of Preventive
Medicine & Biostatistics
University of Toronto
12 Queen's Park Cr. West
Toronto, Ontario
M5S 1A8

Tel. (416) 978-6150

Risk Perception and Risk Acceptance by Young Males in Driving and Other Behaviour Domains.

Gerald J.S. Wilde, with Rudiger M. Trimpop and Peter C. Burns,
Queen's University at Kingston

An investigation is being made of various experimental, self-report, and physiological measures of risk taking and the experience of risk and their pattern of interrelation with special reference to young male drivers. Thus, the hypothesis tested is whether the excess fatality and injury rate in young males is a reflection of a personality trait that manifests itself in multiple domains of behaviour and not only in driving. The possible existence of consistent trans-situational individual differences in risk taking tendency was further tested by determining whether individuals, who are willing to take the risk of not making a financial gain, also accept the risk of losing out on an opportunity for social recognition. The findings obtained so far seem to indicate that there is indeed a generalized tendency to take or to avoid risk, but that this tendency is weak, so that there is no support for the notion of risk-taking tendency as a prominent and consistently displayed personality trait from one situation to another.

The experiments were further designed to verify the notion that those external interventions that do alter the likelihood of loss associated with particular actions, but that do not alter the individuals' levels of willingness to take risks, will lead individuals to adjust their behaviour while their level of risk or caution will remain unchanged. This was clearly supported, as was the hypothesis that individuals will become more cautious when they are given a financial incentive for being cautious and that in the absence of any change in the physical environment. This finding would seem to be highly relevant to the development of accident countermeasures that take the form of rewarding individuals on the condition that they have no accident over a specified period of time.

We are currently in the process of establishing the patterns of interrelationship between the laboratory and self-report measures of risk taking on the one hand, and driving style as observed in actual traffic by independent raters (in the capacity of taxicab passengers) as well as driver records on the other. Data that have been collected from 52 taxi drivers in Kingston for that purpose are presently being analysed.

(Ed. Note: This report was provided at the end of the second year of a three year grant.)

* * *

Professor G.J.S. Wilde, Ph.D.
Department of Psychology
Queen's University
Kingston, Ontario
K7L 3N6

Tel. (613) 545-2889

Seat Belt Law Compliance Amongst Young Drivers

Fred Ruemper, Georgian College

For more than three decades, traffic safety experts have advocated the wearing of seat belts to reduce the number of traffic fatalities and to reduce the incidence of serious injury when involved in an automobile accident. Despite ample evidence of the benefits of buckling up, compliance with seat belt laws in Ontario is persistently low and well below the national average. Young drivers are amongst those least likely to wear seat belts even though their driving record suggests they have the most to gain from doing so. This is particularly distressing given that young drivers have been heavily socialized into safety.

This research project related several other variables to seat belt compliance. Drivers who reported more risk taking (i.e., participation in risky recreational activities, getting high on alcohol or drugs, driving over the speed limit, etc.) and those who reported greater confidence in handling a motor vehicle were less likely to wear a seat belt while driving on the highway. Young drivers who do not wear seat belts are more likely to react against the entire program of seat belt use as an infringement on their "rights" even though they know it is good for them to buckle up.

(Ed. Note: This report was provided at the end of a two year grant. A final report will be available from the author about mid-1991.)

* * *

Mr. F. Ruemper
School of Business
Georgian College of
Applied Arts & Technology
1 Georgian Drive
Barrie, Ontario
L4M 3X9

Tel. (705) 728-1951

The Impact of Motor Vehicle Accidents on Life Expectancy for Canada, 1950-1988

Paul Maxim, T.R. Balakrishnan, & Rajultan Fernando, University of Western Ontario

This study focuses on the impact that motor vehicles have had on life expectancy in Canada since 1950. At present, the lifetime probability of a male newborn dying of a motor vehicle accident (MVA) is approximately 1.6 per cent; for females, the corresponding probability is 0.7 per cent. It is estimated that the total elimination of motor vehicle accidents would add about 7 months to overall male life expectancy, and about 3.4 months to overall female life expectancy. This research shows that over the last 40 years, the relative risk of dying in a motor vehicle accident peaked in the mid-1960s and has since dropped substantially. Today, the expected lifetime risk for males of dying in a MVA is less than at any time since 1950. Lifetime risk patterns for women have tended to parallel those of men, however, it is the case that there has been an overall gender convergence in risk of MVA fatality. In 1950, males faced a lifetime risk of dying in a motor vehicle accident 3.1 times that of women. Currently that ratio stands at approximately 2.2 to 1. Absolute risks have dropped for all age groups; however, the greatest convergence in gender specific rates is among those over 40 years of age.

* * *

Professor Paul Maxim, Ph.D.
Department of Sociology
University of Western Ontario
London, Ontario
N6A 5C2

Tel. (519) 679-2111 Ext. 5121

(Ed. Note: The complete paper is available from the author.)

Models of Accident Causes for Vehicles on Ontario Provincial Roads

Frank Saccomanno, University of Waterloo

An analysis of factors affecting vehicle collision frequencies and rates was presented. Generalized Linear Interactive Modelling (GLIM) models were calibrated to measure the strength of association between accident **rates** (based on million vehicle kilometres travelled) for different road and driver characteristics. Calibration of these models was based on Ontario accident and exposure data for a five year period, 1983 to 1987.

Analyses based on accident frequency alone or on accident rates provide different perspectives on the road safety picture. Sometimes those views supported one another, other times they permitted opposing conclusions on safety. For example, accident numbers are high on freeways, but the accident rate was the lowest of the four road types analysed.

An initial statistical analysis on the data was performed using contingency table and GLIM analysis. Control factors (such as road type and driver sex) were selected from the data set according to their suspected importance in affecting accident frequency and rate. The results reveal some insights into the relation of accident rate and the control factors despite limited information on exposure. Road type, driver age, day of week and time of day were all statistically significant in the GLIM analysis.

Lack of exposure information for some of the factors such as age and blood alcohol level of the driver, at present restricts the extent of possible analyses since tenuous estimates of exposure must be made.

An additional analysis of Ontario collision data was performed using a Bayesian statistical procedure for determining truck accident probabilities for a mix of situational factors and a given freeway environment. Large truck accident involvements were related directly to the occurrence of specific manoeuvres in a traffic stream for a given type of truck and loading condition. Joint probabilities were estimated for critical accident causes, controlling for manoeuvre, truck configuration, and road/traffic environment. These results are useful in identifying unsafe truck features and the conditions where these features are most likely to cause accidents on freeways.

Future research in the third year of the project will refine the models, and, it is hoped, provide an analysis of driver characteristics on accident rates in different road environments.

(Ed. Note: This report was provided at the end of the second year of a three year grant.)

* * *

Professor Frank Saccomanno, Ph.D.
Institute for Risk Research
University of Waterloo
Waterloo, Ontario
N2L 3G1
Tel. (519) 885-1211 Ext. 2631

